SEQUENCE LISTING

<110> De Robertis, Edward M.
      Bouwmeester, Tewis

<120> Endoderm, Cardiac and Neural Inducing
   Factors

<130> 510015-258

<140> US 09/903,188
<141> 2001-07-11

<150> US 60/020,150
<151> 1996-06-20

<160> 10

<170> FastSEQ for Windows Version 3.0

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<212> PRT
<213> Xenopus

<400> 1

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Ser	Leu	Asn	Ser	Arg	Gly	Tyr	Phe	Arg	Lys	Glu	Arg	Gly	Ala	Arg	Arg
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Ser	Lys	Ile	Leu	Leu	Val	Asn	Thr	Lys	Gly	Leu	Asp	Glu	Pro	His	Ile
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Thr	His	Thr	Asn	Arg	Lys	Glu	Pro	Asp	Met	Asn	Lys	Val	Lys	Leu	Phe
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Ser	Thr	Val	Ala	His	Gly	Asn	Lys	Ser	Ala	Arg	Arg	Lys	Ala	Tyr	Asn
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Gly	Ser	Arg	Arg	Asn	Ile	Phe	Ser	Arg	Arg	Ser	Phe	Asp	Lys	Arg	Asn
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Thr	Glu	Val	Thr	Glu	Lys	Pro	Gly	Ala	Lys	Met	Phe	Trp	Asn	Asn	Phe
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Leu	Val	Lys	Met	Asn	Gly	Ala	Pro	Gln	Asn	Thr	Ser	His	Gly	Ser	Lys
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Ala	Gln	Glu	Ile	Met	Lys	Glu	Ala	Cys	Lys	Thr	Leu	Pro	Phe	Thr	Gln
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Asn	Ile	Val	His	Glu	Asn	Cys	Asp	Arg	Met	Val	Ile	Gln	Asn	Asn	Leu

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Cys Phe Gly Lys Cys Ile Ser Leu His Val Pro Asn Gln Gln Asp Arg
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Arg Asn Thr Cys Ser His Cys Leu Pro Ser Lys Phe Thr Leu Asn His
      210                  215                  220
Leu Thr Leu Asn Cys Thr Gly Ser Lys Asn Val Val Lys Val Val Met
  225                  230                  235                  240
Met Val Glu Glu Cys Thr Cys Glu Ala His Lys Ser Asn Phe His Gln
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Thr Ala Gln Phe Asn Met Asp Thr Ser Thr Thr Leu His His
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aaggacgaga aaggacaaaa acatattcac ttaacagcag aggttacttc agaaaagaaa  180
gaggagcacg taggagcaag attctgctgg tgaatactaa aggtcttgat gaaccccaca  240
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acagaaaaga gccagacatg aacaaagtca agcttttctc aacagttgcc catggaaaca  360
aaagtgcaag aagaaaagct tacaatggtt ctagaaggaa tattttttcct cgccgttctt  420
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     <211> 318
     <212> PRT
     <213> Xenopus frazzled

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        Met Pro Asn His Leu His His Ser Thr Gln Ala Asn Ala Ile Leu Ala
                        50                      55                      60
        Ile Glu Gln Phe Glu Gly Leu Leu Thr Thr Glu Cys Ser Gln Asp Leu
                        65                      70                      75              80
        Leu Phe Phe Leu Cys Ala Met Tyr Ala Pro Ile Cys Thr Ile Asp Phe
                        85                      90                      95
        Gln His Glu Pro Ile Lys Pro Cys Lys Ser Val Cys Glu Arg Ala Arg
                        100                     105                     110
        Ala Gly Cys Glu Pro Ile Leu Ile Lys Tyr Arg His Thr Trp Pro Glu
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        Ser Leu Ala Cys Glu Glu Leu Pro Val Tyr Asp Arg Gly Val Cys Ile
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        Ser Pro Glu Ala Ile Val Thr Val Glu Gln Gly Thr Asp Ser Met Pro
                        145                     150                     155             160
        Asp Phe Ser Met Asp Ser Asn Asn Gly Asn Cys Gly Ser Gly Arg Glu
                        165                     170                     175
        His Cys Lys Cys Lys Pro Met Lys Ala Thr Gln Lys Thr Tyr Leu Lys
                        180                     185                     190
        Asn Asn Tyr Asn Tyr Val Ile Arg Ala Lys Val Lys Glu Val Lys Val
                        195                     200                     205
        Lys Cys His Asp Ala Thr Ala Ile Val Glu Val Lys Glu Ile Leu Lys
                        210                     215                     220
        Ser Ser Leu Val Asn Ile Pro Lys Asp Thr Val Thr Leu Tyr Thr Asn
                        225                     230                     235             240
        Ser Gly Cys Leu Cys Pro Gln Leu Val Ala Asn Glu Glu Tyr Ile Ile
                        245                     250                     255
        Met Gly Tyr Glu Asp Lys Glu Arg Thr Arg Leu Leu Leu Val Glu Gly
                        260                     265                     270
        Ser Leu Ala Glu Lys Trp Arg Asp Arg Leu Ala Lys Lys Val Lys Arg
                        275                     280                     285
        Trp Asp Gln Lys Leu Arg Arg Pro Arg Lys Ser Lys Asp Pro Val Ala
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<213> Xenopus frazzled

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tactggccat acctggactg gcgcttctct tattacccaa tgcttactgt gcttcgtgtg     240
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                                                                       360
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acgcaacagc aattgtggaa gtaaaggaga ttctcaagtc ttccctagtg aacattccta   1020
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ctattgttta ctacaagaag ctggtttagt tgattgtagt tctcctttcc ttcttttttt   1440
ttataactat atttgcacgt gttcccaggc aattgtttta ttcaacttcc agtgacagag   1500
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aagtgtttga tacttgggga aagtgaacta attgcaatgg taaatcagag aaaagttgac   1620
caatgttgct tttcctgtag atgaacaagt gagagatcac atttaaatga tgatcacttt   1680
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attttatcat aaatgaagag ctggtttaga ctgtatggtc actgttggga aggtaaatgc   1800
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aaaaaaaaaa aaaaa                                                    1875
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        <213> Xenopus


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                20                  25                  30
Glu Pro Pro Gly Thr Val Ile Ala Val Leu Ser Gln His Ser Ile Phe
        35                  40                  45
Asn Thr Thr Asp Ile Pro Ala Thr Asn Phe Arg Leu Met Lys Gln Phe
    50                  55                  60
Asn Asn Ser Leu Ile Gly Val Arg Glu Ser Asp Gly Gln Leu Ser Ile
65                  70                  75                  80
Met Glu Arg Ile Asp Arg Glu Gln Ile Cys Arg Gln Ser Leu His Cys
                85                  90                  95
Asn Leu Ala Leu Asp Val Val Ser Phe Ser Lys Gly His Phe Lys Leu
            100                 105                 110
Leu Asn Val Lys Val Glu Val Arg Asp Ile Asn Asp His Ser Pro His
        115                 120                 125
Phe Pro Ser Glu Ile Met His Val Glu Val Ser Glu Ser Ser Ser Val
    130                 135                 140
Gly Thr Arg Ile Pro Leu Glu Ile Ala Ile Asp Glu Asp Val Gly Ser
```

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     Asn Ser Ile Gln Asn Phe Gln Ile Ser Asn Asn Ser His Phe Ser Ile
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     Asp Val Leu Thr Arg Ala Asp Gly Val Lys Tyr Ala Asp Leu Val Leu
                      180                    185                    190
     Met Arg Glu Leu Asp Arg Glu Ile Gln Pro Thr Tyr Ile Met Glu Leu
                      195                    200                    205
     Leu Ala Met Asp Gly Gly Val Pro Ser Leu Ser Gly Thr Ala Val Val
                  210                    215                    220
     Asn Ile Arg Val Leu Asp Phe Asn Asp Asn Ser Pro Val Phe Glu Arg
     225                    230                    235                    240
     Ser Thr Ile Ala Val Asp Leu Val Glu Asp Ala Pro Leu Gly Tyr Leu
                      245                    250                    255
     Leu Leu Glu Leu His Ala Thr Asp Asp Asp Glu Gly Val Asn Gly Glu
                      260                    265                    270
     Ile Val Tyr Gly Phe Ser Thr Leu Ala Ser Gln Glu Val Arg Gln Leu
                      275                    280                    285
     Phe Lys Ile Asn Ser Arg Thr Gly Ser Val Thr Leu Glu Gly Gln Val
                  290                    295                    300
     Asp Phe Glu Thr Lys Gln Thr Tyr Glu Phe Glu Val Gln Ala Gln Asp
     305                    310                    315                    320
     Leu Gly Pro Asn Pro Leu Thr Ala Thr Cys Lys Val Thr Val His Ile
                      325     -              330                    335
     Leu Asp Val Asn Asp Asn Thr Pro Ala Ile Thr Ile Thr Pro Leu Thr
                  340                    345                    350
     Thr Val Asn Ala Gly Val Ala Tyr Ile Pro Glu Thr Ala Thr Lys Glu
                  355                    360                    365
     Asn Phe Ile Ala Leu Ile Ser Thr Thr Asp Arg Ala Ser Gly Ser Asn
         370                    375                    380
     Gly Gln Val Arg Cys Thr Leu Tyr Gly His Glu His Phe Lys Leu Gln
     385                    390                    395                    400
     Gln Ala Tyr Glu Asp Ser Tyr Met Ile Val Thr Thr Ser Thr Leu Asp
                  405                    410      .             415
     Arg Glu Asn Ile Ala Ala Tyr Ser Leu Thr Val Val Ala Glu Asp Leu
                  420                    425                    430
     Gly Phe Pro Ser Leu Lys Thr Lys Lys Tyr Tyr Thr Val Lys Val Ser
                  435                    440                    445
     Asp Glu Asn Asp Asn Ala Pro Val Phe Ser Lys Pro Gln Tyr Glu Ala
         450                    455                    460
     Ser Ile Leu Glu Asn Asn Ala Pro Gly Ser Tyr Ile Thr Thr Val Ile
     465                    470                    475                    480
     Ala Arg Asp Ser Asp Ser Asp Gln Asn Gly Lys Val Asn Tyr Arg Leu
                      485                    490                    495
     Val Asp Ala Lys Val Met Gly Gln Ser Leu Thr Thr Phe Val Ser Leu
                  500                    505                    510
     Asp Ala Asp Ser Gly Val Leu Arg Ala Val Arg Ser Leu Asp Tyr Glu
                  515                    520                    525
     Lys Leu Lys Gln Leu Asp Phe Glu Ile Glu Ala Ala Asp Asn Gly Ile
         530                    535                    540
     Pro Gln Leu Ser Thr Arg Val Gln Leu Asn Leu Arg Ile Val Asp Gln
     545                    550                    555                    560
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Asn Asp Asn Cys Pro Val Ile Thr Asn Pro Leu Leu Asn Asn Gly Ser
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Gly Glu Val Leu Leu Pro Ile Ser Ala Pro Gln Asn Tyr Leu Val Phe
            580             585                 590
Gln Leu Lys Ala Glu Asp Ser Asp Glu Gly His Asn Ser Gln Leu Phe
            595             600                 605
Tyr Thr Ile Leu Arg Asp Pro Ser Arg Leu Phe Ala Ile Asn Lys Glu
        610             615                 620
Ser Gly Glu Val Phe Leu Lys Lys Gln Leu Asn Ser Asp His Ser Glu
    625             630                 635                 640
Asp Leu Ser Ile Val Val Ala Val Tyr Asp Leu Gly Arg Pro Ser Leu
                645             650                 655
Ser Thr Asn Ala Thr Val Lys Phe Ile Leu Thr Asp Ser Phe Pro Ser
            660             665                 670
Asn Val Glu Val Val Ile Leu Gln Pro Ser Ala Glu Glu Gln His Gln
            675             680                 685
Ile Asp Met Ser Ile Ile Phe Ile Ala Val Leu Ala Gly Gly Cys Ala
        690             695                 700
Leu Leu Leu Leu Ala Ile Phe Phe Val Ala Cys Thr Cys Lys Lys Lys
705             710                 715                 720
Ala Gly Glu Phe Lys Gln Val Pro Glu Gln His Gly Thr Cys Asn Glu
            725             730                 735
Glu Arg Leu Leu Ser Thr Pro Ser Pro Gln Ser Val Ser Ser Ser Leu
            740             745                 750
Ser Gln Ser Glu Ser Cys Gln Leu Ser Ile Asn Thr Glu Ser Glu Asn
            755             760                 765
Cys Ser Val Ser Ser Asn Gln Glu Gln His Gln Gln Thr Gly Ile Lys
770             775                 780
His Ser Ile Ser Val Pro Ser Tyr His Thr Ser Gly Trp His Leu Asp
785             790                 795                 800
Asn Cys Ala Met Ser Ile Ser Gly His Ser His Met Gly His Ile Ser
            805             810                 815
Thr Lys Val Gln Trp Ala Lys Glu Ile Val Thr Ser Met Thr Val Thr
            820             825                 830
Leu Ile Leu Val Glu Asn Gln Lys Arg Arg Ala Leu Ser Ser Gln Cys
            835             840                 845
Arg His Lys Pro Val Leu Asn Thr Gln Met Asn Gln Gln Gly Ser Asp
    850             855                 860
Met Pro Ile Thr Ile Ser Ala Thr Glu Ser Thr Arg Val Gln Lys Met
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Gly Thr Ala His Cys Asn Met Lys Arg Ala Ile Asp Cys Leu Thr Leu
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<213> Xenopus

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ctggcactgt aattgcagtg ttgtcacaac actccatatt taacactaca gatatacctg    300
caaccaattt ccgtctaatg aagcaattta ataattccct tatcggagtc cgtgagagtg    360
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<213> Mouse FRZB-1

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            20                  25                  30
Ala Ala Cys Glu Pro Val Arg Ile Pro Leu Cys Lys Ser Leu Pro Trp
        35                  40                  45
Asn Met Thr Lys Met Pro Asn His Leu His His Ser Thr Gln Ala Asn
    50                  55                  60
Ala Ile Leu Ala Met Glu Gln Phe Glu Gly Leu Leu Gly Thr His Cys
65                  70                  75                  80
Ser Pro Asp Leu Leu Phe Phe Leu Cys Ala Met Tyr Ala Pro Ile Cys
                85                  90                  95
Thr Ile Asp Phe Gln His Glu Pro Ile Lys Pro Cys Lys Ser Val Cys
            100                 105                 110
Glu Arg Ala Arg Gln Gly Cys Glu Pro Ile Leu Ile Lys Tyr Arg His
        115                 120                 125
Ser Trp Pro Glu Ser Leu Ala Cys Asp Glu Leu Pro Val Tyr Asp Arg
    130                 135                 140
Gly Val Cys Ile Ser Pro Glu Ala Ile Val Thr Ala Asp Gly Ala Asp
145                 150                 155                 160
Phe Pro Met Asp Ser Ser Thr Gly His Cys Arg Gly Ala Ser Ser Glu
                165                 170                 175
Arg Cys Lys Cys Lys Pro Val Arg Ala Thr Gln Lys Thr Tyr Phe Arg
            180                 185                 190
Asn Asn Tyr Asn Tyr Val Ile Arg Ala Lys Val Lys Glu Val Lys Met
        195                 200                 205
Lys Cys His Asp Val Thr Ala Val Val Glu Val Lys Glu Ile Leu Lys
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Lys Cys His Asp Val Thr Ala Val Val Glu Val Lys Glu Ile Leu Lys
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Ser Ser Leu Val Asn Ile Pro Arg Asp Thr Val Asn Leu Tyr Thr Ser
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Trp Asp Met Lys Leu Arg His Leu Gly Leu Ser Lys Ser Asp Ser Ser
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